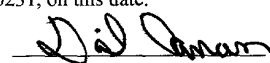


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June 4, 2001

Date

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2 METHOD AND SYSTEM FOR REPORTING EVENT DATA
3 TO REQUESTING SUBSCRIBERS

4 The present invention generally relates to an improved method
5 and system for reporting event data to requesting subscribers. More
6 specifically, it relates to an improved method and system for reporting event
7 data to requesting subscribers using a manufacturing repository for collecting
8 event data that is connected to a subscriber profile system for storing
9 information relating to subscribers and a production system for storing
10 information relating to manufacturing.

11 BACKGROUND OF THE INVENTION

12 Event data, such as printer machine language ("PML"), is
13 currently gathered only when there are operating malfunctions on the
14 peripheral devices. Event data includes information for significant occurrences

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1 or happenings (e.g., paper jams, low memory, or undefined paper size) of a
2 peripheral device. Aside from the event data being useful to service
3 technicians trying to resolve a malfunction, the event data can also be
4 extremely valuable for research and development, manufacturing and
5 marketing.

6 Because of Internet communications, most peripheral devices are
7 now embedded with a server, such as a web server. As a result, this event data
8 can be downloaded by connected devices over the Internet. Currently, event
9 data can already be downloaded via emails, which is disclosed in a commonly
10 owned U.S. Patent application filed on _____ entitled "E-Mail-
11 Based Remote Diagnostic Facility" bearing Serial No. _____
12 by James E. Obert, Letty B. Nutt, William A. Cox, James M. Sangroniz, and
13 Charles K. Keyes, assigned to HP company. This patent application is
14 specifically incorporated by reference herein.

15 Since such event data may be of great interest for multiple
16 departments, it would be advantageous to track the data and send it to various
17 groups or dependent. Consequently, there is a need for an improved system that
18 can take advantage of gathering this valuable information and routing it to
19 various groups and persons in the company.

20 BRIEF SUMMARY OF THE INVENTION

21 The present invention is directed to an improved method and
22 system for reporting event data to requesting subscribers. More specifically, it
23 relates to an improved method and system for reporting event data to
24 requesting subscribers using a manufacturing repository for collecting event
25 data, which is connected to a subscriber profile system for storing information

1 relating to subscribers and a production system for storing information relating
2 to manufacturing.

3 The present invention provides a method that includes the steps
4 of gathering event data from a plurality of devices connected to the
5 manufacturing repository, saving the event data to a database, notifying
6 designated subscribers according to criteria indicated by subscriber profiles,
7 and generating a scheduled subscription report according to criteria indicated
8 by subscriber profiles independently of the foregoing steps.

9 DESCRIPTION OF THE DRAWINGS

10 FIGURE 1 is a schematic diagram of a network system in which
11 the present method is implemented;

12 FIG. 2 is an overall schematic diagram of the preferred
13 monitoring criteria of the manufacturing repository;

14 FIG. 3 is an overall schematic diagram of the manufacturing
15 repository in relation to other systems;

16 FIG. 4 illustrates an example of one of the web pages for setting
17 up the subscriber profile;

18 FIG. 5 is a flow chart illustrating the preferred functionality of a
19 set up method of the subscriber profile system;

20 FIG. 6 is a flow chart illustrating the preferred functionality of a
21 receive method of the manufacturing repository; and,

22 FIG. 7 is a flow chart illustrating the preferred functionality of a
23 report method of the manufacturing repository.

24 GLOSSARY OF TERMS AND ACRONYMS

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1 scheduled subscription reports are independently generated according to
2 criteria indicated by the subscriber profiles. It should be understood that the
3 use of "a" or "an" is also intended to mean "one or more" for better readability.

4 Turning now to the drawings, and particularly FIG. 1, a
5 schematic diagram of a network system in which the present method is
6 implemented is generally indicated as part of a preferably wide area network
7 10. A plurality of devices 12, 12' are connected to the manufacturing
8 repository ("MREP") 14, which is provided by a plurality of computers as
9 shown. It should be noted that a general device will be referred to in order to
10 indicate that the preferred embodiment of the present invention can be
11 implemented on a computing device 12 or a peripheral device 12'.
12 Furthermore, the computing device 12 may be a computer, a microprocessor or
13 other processing means such as an Application Specific Integrated Circuit
14 ("ASIC") or like, that is collecting data from multiple peripheral devices 12'.
15 The devices are preferably implemented with the use of a web server, since the
16 preferred network connection 10 is the Internet. So, the peripheral devices 12'
17 preferably include embedded web servers, and the computing devices 12
18 similarly include ways of connecting to the Internet. Furthermore, the
19 computing device 12 may be a computer that is collecting data from multiple
20 peripheral devices 12'.

21 The Internet is the preferable network connection 10 because it
22 provides a very flexible and universal way of communicating. The
23 accessibility of the Internet from almost any location in the world is a very
24 desirable aspect and is important to the scale of utilization of the present
25 invention. However, other types of networks can certainly be used in
26 conjunction with the Internet or even in place of it. Because the network
27 system needed for the implementation of the present invention varies greatly in

1 complexity and size, an explanation of the current preferred embodiment of the
2 network topology is given as an example. Other network systems for
3 implementing the present invention are contemplated and are within the scope
4 of the present invention.

5 An overall schematic diagram of the preferred monitoring criteria
6 of the MREP is shown in FIG. 2 and indicated generally at 16, which is an
7 example of the type of information that can be gathered and used. The MREP
8 gathers the event data from peripheral devices or computing devices, and in
9 turn monitors various configurations and occurrences of a given model or a
10 given location. These monitoring criteria can include, among other things,
11 failure patterns, configuration and failure links, configuration patterns, use and
12 failure links, and use patterns. All of this valuable data can be grouped and
13 sent to various groups and persons for improving such things as services,
14 product and marketing. The event data, on the other hand, preferably includes
15 data relating to information, such as region, manufacture, model and/or
16 customer identification. But, of course, the data can include more or less of
17 than this particular information. The information content of the event data may
18 be different depending on the chosen implementation of the present invention,
19 and such other variations are within the scope of the present invention.

20 An overall schematic diagram of the manufacturing repository in
21 relation to other systems is shown in FIG. 3, and indicated generally at 18. The
22 MREP 14 is preferably connected to multiple systems that gather various data
23 to be stored preferably on a central database. One system is a production
24 system 20, which stores data relating to manufacturing. Another system is a
25 Java Virtual Machine ("JVM") Design system 22, which gathers and stores
26 data relating to the JVM designs and diagnostics. There is also a remote
27 diagnostic device system 24 that gathers and stores servicing information as

1 described in the aforementioned Obert, et. al. patent application. All these
2 systems focus on gathering the event data for the MREP to generate event
3 reports 26 and event notifications 28. The subscriber profile system, in
4 contrast, stores users' information. Using the subscriber profile system, users
5 can set up or edit their subscriber profile preferably by using a web page on the
6 Internet.

7 Although multiple systems are used and shown, the present
8 invention can also be implemented with just the MREP having some or all of
9 these systems. For example, the MREP can gather the event data and
10 subscriber profiles with no other systems connected to it. However, since some
11 of these systems described have already been implemented, the preferred
12 embodiment is customized to work with previously systems that are already in
13 place. These various implementations of the present invention can be included,
14 and they are to be considered within the scope of the present invention.

15 An example of one of the web pages for setting up the subscriber
16 profile is shown in FIG. 4, and indicated generally at 40. In this example, there
17 are multiple fields shown. The user name, email and personal home page fields
18 are description relating to the subscriber identity. The remaining fields,
19 specifically "notify of new data" and "send subscription report," relates to the
20 kinds of notifications and subscription reports that the subscriber can request.

21 Subscribers, using the "specify event data" field, can indicate the
22 kind of event data that an automatic notification should be sent to them
23 whenever the MREP receives such event data. The subscriber may have
24 inserted several entries in the specify event data field, such as patterns,
25 configuration and link failure, configuration patterns, use or failure links, and
26 use patterns, among other types of event data. These are preferably made by
27 selecting one or more items that have been predefined and placed in the field

1 for subscriber selections. This eliminates the possibility of excluding items that
2 would not be found during a search because a subscriber used language that
3 was different from a normal or expected description of an item. However, the
4 system may also permit the use of subscriber defined key words, if desired.

5 On the other hand, the "send subscription report" includes fields
6 that define the criteria of the subscription reports. For example, in the field,
7 "all event data that relates to," subscribers can indicate an error code number
8 (e.g., error 13.00.10) and/or a region number (e.g., region 267) criteria for the
9 subscription reports. In other words, a report will be generated, for example, to
10 indicate the frequency of error code number 13.00.10 at region 267. The
11 region criteria is especially helpful, because a technician will be able to track
12 the kinds of errors that a particular manufacture is producing. For example, if
13 printers that are produced in Mexico show a pattern of having a high frequency
14 of paper jams error, product inspection personnel can isolate the problems with
15 greater focus and precision. With this kind of valuable information, the
16 manufacturers can quickly resolve these production problems. Subscribers can
17 also choose a time cycle, such as none, daily, weekly, monthly, quarterly or
18 yearly, for when they should receive these reports.

19 Turning to an important aspect of the preferred embodiment of
20 the present invention, a flow chart of the preferred functionality of a method to
21 set up or edit subscriber profiles of the subscriber profile system is shown in
22 FIG. 5, and indicated generally at 50. The set up method is initiated by a user
23 requesting to set up or edit a subscriber profile (block 52) through preferably a
24 web page on the Internet (shown in FIG. 4). As shown in FIGS. 4 and 5, the
25 user must enter various information, such as contact information (block 54),
26 requested notification (block 56), subscription criteria (block 58), and a time
27 cycle of the subscription (Block 60). Upon the user's completion with the

1 entering of the new subscriber profile, the user sends it to the MREP (block
2 62), which is, in turn, saved to the database of the MREP (block 64). The set
3 up process ends after the last step (block 66).

4 Because the parameters of the subscriber profile can be varied, it
5 should be understood that the method shown in FIG. 5 can be changed.
6 Although the preferred method and parameters have been shown, it is very
7 likely it will be altered depending on the implementation of the present
8 invention. The current parameters of the subscription report may include text,
9 tables, charts and graphs, as well as other forms of information. Thus, it should
10 be noted that these other parameters and methods are contemplated, and they
11 are within the scope of the present invention.

12 A flow chart of the preferred functionality of a method for
13 receiving event data by the MREP is shown in FIG. 6, and indicated generally
14 at 70. The receive method is initialized by event data being sent to the MREP
15 (block 72). After the MREP receives the event data (block 74), it saves the
16 event data in the database (block 76). The MREP next searches the subscriber
17 profile system for any requested notifications for the event data (block 78). It
18 is then determined whether there is any requested notifications that are due
19 (block 80). If not, the process ends from this point on (block 82). Otherwise,
20 the process continues by composing a notification for each request that needs to
21 be sent (block 84). The MREP then sends the composed notifications to the
22 designated subscribers (block 86), and ends the process (block 88).

23 A flow chart illustrating the preferred functionality of a method
24 for generating report is shown in FIG. 7, and indicated generally at 100. The
25 report method is initialized by an indication to the MREP that subscription
26 reports need to be generated (block 102). The indication is preferably
27 prompted by a predetermined time schedule, such as daily or weekly as

1 specified by the web page choices shown in FIG. 4. However, other ways,
2 such as a predefined event can be used, and these other implementations are
3 within the scope of the present invention. The subscriber profile system is then
4 searched by the MREP (block 104) to determine whether any subscription
5 report is due at this time (block 106). If no subscription report is due (block
6 106), the process ends (Block 108). If, however, a subscription report is due
7 (block 106), the MREP accesses the needed information to generate the
8 subscription report from the subscriber profile system (Block 110) and the
9 production system (block 112).

10 Next, the subscriber profile system (block 114) and the
11 production system (block 116) are updated to reflect that a report is being
12 generated. To generate the subscription report, the MREP sorts the information
13 obtained (block 118), and formats the information according to criteria
14 indicated by the subscriber's profile (block 120). Depending on the requested
15 format of the subscription report and the criteria of the subscriber profile, the
16 MREP can further generate a table, a chart and/or a graph for the subscription
17 report (block 122). Once the subscription report is composed, the MREP sends
18 out the report according to the criteria indicated by the subscriber profile (block
19 124).

20 From the foregoing description, it should be understood that an
21 improved method and system for reporting event data to requesting subscribers
22 has been shown and described, which has many desirable attributes and
23 advantages. The method and system that can automatically track and sent
24 various event data to multiple relevant groups, which can be of great
25 importance to different departments in a company.

26 While various embodiments of the present invention have been
27 shown and described, it should be understood that other modifications,

1 substitutions and alternatives are apparent to one of ordinary skill in the art.
2 Such modifications, substitutions and alternatives can be made without
3 departing from the spirit and scope of the invention, which should be
4 determined from the appended claims.

5 Various features of the invention are set forth in the appended
6 claims.